Review of: "Rapid Atlantification along the Fram Strait at the beginning of the 20th century"

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The year coal mining commenced in Spitsbergen (1916), the abundance of a lipid solely synthesized by a marine archaea phylum, the oxygen isotope composition of an icecap and of a common species of foraminifera, and a Bayesian change point analysis all are used together with other indicators in a recent new paper[1] that puts the “Atlantification," of the Arctic-north Atlantic boundary in a new perspective. The new analysis, largely based upon studies of a sediment box core and a gravity core, brings back the date of observed changes at the North Atlantic - Arctic boundary to the end of the 19th century and documents the significant shift recorded in sediments in Fram Strait at the end of the Little Ice Age, which extended from ~1650 CE to nearly 1900. The use of the terminology of Atlantification for description of on-going changes in the Arctic Ocean has become widespread in the past 20 years, even to the extent that the word is often no longer capitalized and it is used without quotation marks. Just two months into 2022, dozens of peer-reviewed papers have already been published this year that use the terminology Atlantification in their abstracts. The wording may have been first introduced for discussions of the changing nature of the Barents Sea by two papers published in 2002[2][3] in the Journal of Marine Systems and the terminology was also popularized by a widely cited 2006 paper in Progress in Oceanography.[4] Paul Wassmann, the second author of all three of these papers, has focused a long and illustrious career at the University of Tromsø, the Arctic University of Norway on the topic of how the Arctic is changing and what the manifestations are in biological terms, such as the appearance and now persistence of Atlantic zooplankton in fjords in Svalbard. Changes in the Arctic marginal seas have led to the development of significant research initiatives such as the Nansen Legacy[5] that have brought new prominence to Norway in leadership of arctic research. The contributions of Italian scientists to this study[1] also provide a robust indication of the broad international enterprise that is addressing climate change research at high latitudes. Coordination of arctic research is promoted by intergovernmental forums such as the Arctic Council, but also at the scientist-to-scientist level by working groups of the International Arctic Science Committee. Tesi et al.[1] have shown that centennial scale arctic change is recorded in sediments through the appearance of biomarkers that provide a distinct record and link the end of the Little Ice Age more directly with the scope of change being observed throughout the Arctic in this century. In some respects, the documentation of these changes means that we should consider modern climate change and its challenges to be a more complex process that extends back historically more than the past several decades when satellite observations of sea ice and recent programs such as the Nansen Legacy have

provided a granular documentation of Arctic change that is underway. The terminology of Atlantification (and borealization) moreover has its own limitations. Analogous physical and biological changes are being observed in the Pacific influenced Arctic, so a parallel term, Pacification is now being used[6], but the word also has an unhappy connotation dating back to US war in Vietnam. Nevertheless this new contribution that presents the biomarker and sediment record from the depths of Fram Strait brings an insightful longer-term confirmation of the physical and biological changes that have been observed at arguably the key entryway between the Atlantic and Arctic Oceans.

References

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